Alpha Magnetic
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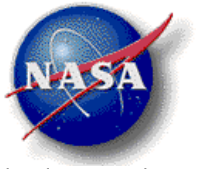
Open Paper Management Tool
Open Items Report



National Aeronautics and
Space Administration

Thursday, November 10, 2005

Open Paper Management Tool (OPMT) Statistics

Total Action Items:	***562***	***Total Action Items Open:***	***85***
Total Action Items Closed:	***454***	***Action Items Past Due:***	***66***

List of Action Items Past Due:

Action Item Number:	***Date Due:***	***Action Item Number:***	***Date Due:***	***Action Item Number:***	***Date Due:***
Action Item 04-046	*07/31/2005*	*Action Item 05-054*	*09/30/2005*	*AMS_02-Thermal_CDR-17*	*06/15/2005*
Action Item 04-051	*08/30/2005*	*Action Item 05-057*	*10/31/2005*	*AMS_02-Thermal_CDR-56*	*08/01/2005*
Action Item 04-056	*08/15/2005*	*Action Item 05-058*	*10/15/2005*	*AMS_02-Thermal_CDR-57*	*06/01/2005*
Action Item 04-120	*03/31/2005*	*Action Item 05-059*	*09/21/2005*	*AMS_02-Thermal_CDR-60*	*08/15/2005*
Action Item 05-012	*09/30/2005*	*Action Item 05-060*	*10/15/2005*	*AMS_02-Thermal_CDR-68*	*06/15/2005*
Action Item 05-015	*08/15/2005*	*Action Item 05-062*	*09/30/2005*	*AMS_02-Thermal_CDR-82*	*08/01/2005*
Action Item 05-017	*09/05/2005*	*Action Item 05-067*	*09/16/2005*	*AMS_02-TTCS_PDR-1*	*07/15/2005*
Action Item 05-018	*10/01/2005*	*Action Item 05-068*	*10/31/2005*	*AMS_02-TTCS_PDR-2*	*07/15/2005*
Action Item 05-020	*10/17/2005*	*Action Item 05-069*	*09/30/2005*	*AMS_02-TTCS_PDR-3*	*07/15/2005*
Action Item 05-023	*10/17/2005*	*Action Item 05-070*	*09/30/2005*	*AMS_02-TTCS_PDR-4*	*07/15/2005*
Action Item 05-025	*10/17/2005*	*AMS_02-CDR-08*	*07/31/2005*	*AMS_02-TTCS_PDR-5*	*07/15/2005*
Action Item 05-028	*10/17/2005*	*AMS_02-CDR-12*	*03/31/2005*	*AMS_02-TTCS_PDR-6*	*07/15/2005*
Action Item 05-029	*10/17/2005*	*AMS_02-CDR-13*	*03/31/2005*	*AMS_02-TTCS_PDR-7*	*07/15/2005*
Action Item 05-033	*10/17/2005*	*AMS_02-PDS_CDR-06*	*06/15/2005*	*AMS_02-TTCS_PDR-8*	*07/15/2005*
Action Item 05-042	*10/28/2005*	*AMS_02-PDS_CDR-08*	*05/16/2005*	*AMS_02-TTCS_PDR-9*	*07/15/2005*
Action Item 05-044	*10/28/2005*	*AMS_02-PDS_CDR-09-2*	*05/16/2005*	*AMS_02-TTCS_PDR-10*	*07/15/2005*
Action Item 05-046	*09/30/2005*	*AMS_02-Thermal_CDR-03*	*06/15/2005*	*AMS_02-TTCS_PDR-11*	*07/15/2005*
Action Item 05-049	*10/31/2005*	*AMS_02-Thermal_CDR-06*	*06/15/2005*	*AMS_02-TTCS_PDR-12*	*07/15/2005*
Action Item 05-053	*09/22/2005*	*AMS_02-Thermal_CDR-15*	*06/15/2005*	*AMS_02-TTCS_PDR-14*	*07/15/2005*

Open Paper Management Tool (OPMT) Statistics

Action Item Number:	***Date Due:***
AMS_02-TTCS_PDR-18	*07/15/2005*
AMS_02-TTCS_PDR-19	*07/15/2005*
AMS_02-TTCS_PDR-20	*07/15/2005*
AMS_02-TTCS_PDR-23	*07/15/2005*
AMS_02-TTCS_PDR-25	*06/30/2005*
AMS_02-TTCS_PDR-26-1	*06/15/2005*
AMS_02-TTCS_PDR-26-2	*07/15/2005*
AMS_02-TTCS_PDR-27	*06/30/2005*
UPS-CDR-04	*08/26/2005*

Open Action Items Report

Open Item Number: 04-046 **RID Open Date:** 8/1/2004

Title:

Intiator(s):

Description:

Action Item Information

Actionee(s): Bill Hungerford/AMS
Trent Martin/EA

Action Due Date: 7/31/2005

Action: Build an integrated logic flow, assembly, and test schedule for the payload at CERN. Include a clear plan for Quality Control and MRB authority. Include iterative electrical/functional testing to ensure adequate operation of hardware/software before access to any given crate or detector is no longer possible.

Action Status: 10/17/2005 - Plan will be released as CR shortly.
8/29/2005 - JSC review in process - document should be ready for collaboration review by 9 Sep.
8/19/2005 - Draft version released for JSC review.
8/15/2005 - Draft version of plan expected by 8/31/2005.
2/09/2005 - We will build an integrated plan at JSC to go through with the AMS Collaboration. The plan will have to be approved by the AMS Collaboration. The plan is to have: (1) NASA representative at CERN for the integration process and (2)NASA provide a quality representative to be at CERN at all time for quality control during integration process.
08/01/04 - Plan due by 09/18/04; Questionnaire sent to detector groups to initiate process. Meeting scheduled at CERN Sept 13 and 14, chaired by Giuliano Laurenti, to consolidate and refine inputs from various detector and sub-system groups. Should result in development of preliminary schedule for review at October TIM

Open Action Items Report

Open Item Number: 04-051 **RID Open Date:** 8/1/2004

Title:

Intiator(s):

Description:

Action Item Information

Actionee(s): OZ/Bob Miley **Action Due Date:** 8/30/2005

Action: Complete and sign AMS PIA.

Action Status: 10/17/2005 - All issues resolved except SSRMS power/current requirements. Draft text under review by CGS.
8/26/2005 - Based on agreement with Hartman, OZ will attempt to sign PIA prior to October TIM. OZ FY2006 AMS funding under review.
8/8/2005 - Hartman meeting moved to 8/26. PIA CR release moved to 9/9. PIA signtaure still scheduled for 12/1.
8/3/2005 - Hartman meeting moved to 8/19. PIA CR scheduled to be released 8/30. PIA scheduled to be signed 12/1.
5/25/2005 - Meeting scheduled with Dan Hartman on 7/13 to resolve all final issues, PIA scheduled to be signed on 8/30. Specific TBDs being transferred into new OPMT items 05-010, 05-011, and 05-012.
3/02/2005 - It will be three weeks before it is known the amount of power to be provided. It will not be 3kW. Win Reid/OZ to set up meeting with Chris Tutt, Trent Martin, Craig Clark, John Cornwell, and Henry Hoang. Due date for this action item was changed to June 30, 2005.
02/09/2005 - ISS ICD – turning in PIA baselined first. Plan to remove the TBRs. Win Reid to check on the actions on the ISS side.
12/10/2004 - ISS ICD to be released 02/05; question how to get into official documentation.

Open Action Items Report

Open Item Number: 04-056 **RID Open Date:** 8/1/2004

Title:

Intiator(s):

Description:

Action Item Information

Actionee(s): Chris Tutt/ESCG
Bill Hungerford/AMS
Paul Nemeth/ESCG

Action Due Date: 8/15/2005

Action: Provide the plan for Surveillance of Safety Critical assembly and test steps of Collaboration Hardware.

Action Status: 8/15/2005 - Initial surveillance request due out by 8/30/2005.
8/3/2005 - Chris Tutt to review current schedule and SVMs and send out verification requests to relevant parties. MVP still in work, so Surveillance Plan on hold.
2/9/2005 - Mike Fohey and David Kaplan to discuss the MVP schedule. The MVP is a deliverable on the ESCG contract and is to be delivered no later than 8 months from February 1, 2005.

Open Action Items Report

Open Item Number: 04-120 **RID Open Date:** 12/6/2004

Title:

Intiator(s):

Description:

Action Item Information

Actionee(s): Leland Hill/ESCG **Action Due Date:** 3/31/2005

Action: Work with all AMS experimenters to close out all open issues associated with the Phase II Flight Safety Review Safety Data Package.

Action Status: 8/29/2005 - Release date now presumed to be 9/9. All comments still to be incorporated by 9/30.
8/15/2005 -Draft versions of the writeup due by 8/31, full JSC review and all comments incorporated by 9/30.
8/8/2005 - Trent Martin to send updated list of final items to various group leads.
8/3/2005 - Many issues resolved, but cryomagnet and TTCS still have major open items.
6/29/2005 - Letter has been distributed to the collaboration.
5/25/2005 - Letter describing all open actions has been prepared and forwarded to Prof. Ting.
4/27/2005 - New set of actions in work. Some actions have been answered. Addressing specific organizations/individuals that have not responded. Safety package should be ready by the end of June to distribute to the collaboration approximately two weeks before the July TIM. Responses from the collaboration will be due prior to or during the TIM. The safety package will be updated and redistributed to the collaboration after the TIM. Trent Martin/EA2 requested to see a status of action items at each CCB/Tag-up meeting. Per Trent Martin/EA2, hold firm to the May 31st due date for new list of action items.
1/19/05 - Some data has been received since the October TIM and January TIM; Some data not due until March 2005; Due date was changed from 1/31/05 to 3/31/05; Final Safety Data Package due 03/08/05.

Open Action Items Report

Open Item Number: 05-012 **RID Open Date:** 5/25/2005

Title: S-Band Usage

Intiator(s):

Description:

Action Item Information

Actionee(s): Bob Miley/OZ **Action Due Date:** 9/30/2005

Action: AMS PIA requests an average of 10 bytes/sec of Critical Health Data be transferred through the S-band antenna. Negotiate agreement between ISS and AMS On S-band usage and document in ICD.

Action Status:

Open Action Items Report

Open Item Number: 05-015 **RID Open Date:** 8/3/2005

Title: MLI Specification

Intiator(s): Trent Martin/EA

Description: AMS-02 MLI Specification needed.

Action Item Information

Actionee(s): John Cornwell/EC **Action Due Date:** 8/15/2005

Action: Develop AMS-02 MLI specification. Upon release of specification, CGS to revise MLI weight estimates and update mass budget accordingly.

Action Status: 10/17/2005 - MLI spec released as CR, under review by multiple parties. ISS has concerns about blanket lifetime. On weight issue, NASA will be building samples and will weigh them at various assembly stages to get good estimate. These will be presented at the October TIM.
8/28/2005 - Draft specification released 8/25, under review at JSC.
8/22/2005 - Trent Martin to contact Chen Lin and determine new release date for draft specification. Second part of action added with Marco Molina/CGS identified as actionee.
8/15/2005 - John Cornwell plans to release draft specification by COB today for JSC review. Review comments incorporated and out for Collaboration review by 8/23. Specification will be formally released through CCB as a CR.

Open Action Items Report

Open Item Number: 05-017 **RID Open Date:** 8/22/2005

Title: UPS maximum temperature

Intiator(s): Tim Urban

Description: UPS worst case hot temperature including magnet charging needs to be included in thermal ICD and thermal test plans.

Action Item Information

Actionee(s): Craig Clark/ESCG **Action Due Date:** 9/5/2005

Action: Calculate new UPS worst case temperature and provide to CGS.

Action Status: 11/7/2005 - UPS contract in work at JS.
10/17/2005 - New UPS SOW expected to be released by the end of the week.
9/2/2005 - Craig Clark/ESCG has provided worst case conditions to CGS, and has requested analysis results for these cases. These results will be incorporated in the next UPS SOW revision.

Open Action Items Report

Open Item Number: 05-018 **RID Open Date:** 8/22/2005

Title: Thermal Testing Requirements

Intiator(s): Tim Urban

Description: UPS worst case hot temperature including magnet charging needs to be included in thermal ICD and thermal test plans.

Action Item Information

Actionee(s): Tim Urban **Action Due Date:** 10/1/2005

Action: Upon completion of 05-017, update CSIST SOW to ensure that thermal testing done to appropriate temperature levels.

Action Status:

Open Action Items Report

Open Item Number: 05-020 **RID Open Date:** 9/13/2005

Title: Cryocooler Finger Deflection Analysis

Intiator(s):

Description: Provide copies of the Cryocooler cold finger deflection analysis to ESCG for review.

Action Item Information

Actionee(s): Stephen Harrison/SCL **Action Due Date:** 10/17/2005

Action: Provide copies of the Cryocooler cold finger deflection analysis to ESCG for review.

Action Status:

Open Action Items Report

Open Item Number: 05-021 **RID Open Date:** 9/13/2005

Title: MLI Performance under Welding Heat Loads

Intiator(s):

Description: Determine whether magnet MLI will survive thermal loads from welding operations without significant damage.

Action Item Information

Actionee(s): Phil Mott/ESCG, Stephen Harrison/SCL **Action Due Date:** 11/21/2005

Action: Determine what size MLI sample could be inserted into the STA easily underneath the weld area using scrap MLI already available at SCL.

Action Status: 11/10/2005 - ON hold pending results of weld testing at STADCO.

Open Action Items Report

Open Item Number: 05-022 **RID Open Date:** 9/13/2005

Title: Cryosystem Component Testing

Intiator(s):

Description: Demonstrate how cryosystem components will be validated with a non-cryogenic STA.

Action Item Information

Actionee(s): Chris Tutt/ESCG, Stephen Harrison/SCL, Phil Mott/ESCG **Action Due Date:** 11/21/2005

Action: Develop plan for validating all cryosystem components, either through component level testing or analysis.

Action Status:

Open Action Items Report

Open Item Number: 05-023 **RID Open Date:** 9/13/2005

Title: STA Gate Valve

Intiator(s):

Description: APO will provide the gate valve for the STA article using a single-seal off-the-shelf valve.

Action Item Information

Actionee(s): Phil Mott/ESCG **Action Due Date:** 10/17/2005

Action: Procure requested gate valve and provide to SCL for integration onto the STA VC.

Action Status: 11/10/2005 - Gate valve will be provided to SCL instead of to building 10.

Open Action Items Report

Open Item Number: 05-024 **RID Open Date:** 9/13/2005

Title: Flight Unit Gate Valve

Intiator(s):

Description: Flight VC requires gate valve with double-seals.

Action Item Information

Actionee(s): Phil Mott/ESCG, Stephen Harrison/SCL **Action Due Date:** 11/21/2005

Action: Design modified gate valve incorporating double O-ring seals and provide to SCL for installation onto the flight unit.

Action Status:

Open Action Items Report

Open Item Number: 05-025 **RID Open Date:** 9/13/2005

Title: STA Parts List

Intiator(s):

Description: Develop a parts list for the full STA VC.

Action Item Information

Actionee(s): Stephen Harrison/SCL **Action Due Date:** 10/17/2005

Action: Provide copies of the STA design drawings and Bill of Materials to ESCG in order to pull them into a complete Parts List.

Action Status:

Open Action Items Report

Open Item Number: 05-028 **RID Open Date:** 9/13/2005

Title: Russian Funding Issues

Intiator(s):

Description: Provide necessary data to allow remainder of Russian burst disk/strap funding to be released.

Action Item Information

Actionee(s): Stephen Harrison/SCL **Action Due Date:** 10/17/2005

Action: Determine what information is currently available to address Russian concerns about strap development and provide to Prof. Hans Hofer/ETH.

Action Status: 11/4/2005 - Information provided. Russian funding issues will be tracked by the MWG.

Open Action Items Report

Open Item Number: 05-029 **RID Open Date:** 9/13/2005

Title: CTG Strap Assembly Option

Intiator(s):

Description: Determine whether or not assembly of the straps at CTG instead of SCL is a cost-effective way of saving schedule.

Action Item Information

Actionee(s): Stephen Harrison/SCL **Action Due Date:** 10/17/2005

Action: Provide cost and schedule estimates for 1) CTG to assemble straps, and 2) SCL to assemble straps using additional technicians.

Action Status:

Open Action Items Report

Open Item Number: 05-032 **RID Open Date:** 9/13/2005

Title: CAB Magnet Charging Cables Strain Relief

Intiator(s):

Description: Design and build a strain relief device for the CAB magnet charging cables.

Action Item Information

Actionee(s): Stephen Harrison/SCL **Action Due Date:** 11/21/2005

Action: Provide proposal for development and manufacturing of a strain relief device for the CAB charging cables to NASA.

Action Status:

Open Action Items Report

Open Item Number: 05-033 **RID Open Date:** 9/13/2005

Title: HBE He Tank Contract

Intiator(s):

Description: Sign subcontract with HBE for development of the flight Helium tank and provide phased spending plan to NASA.

Action Item Information

Actionee(s): Chris Tutt/ESCG **Action Due Date:** 10/17/2005

Action: Sign subcontract with HBE for development of the flight Helium tank and provide phased spending plan to NASA.

Action Status: 11/4/2005 - Proposal released to HBE. Response expected by 8 Nov.
10/17/2005 - Draft SOW under review at JS. Initial cost estimate by HBE received by JS.

Open Action Items Report

Open Item Number: 05-039 **RID Open Date:** 9/13/2005

Title: Total Mass Capability of USS-02

Intiator(s):

Description: Determine total mass capability of USS-02

Action Item Information

Actionee(s): Chris Tutt/ESCG, Bruce Sommer/ESCG **Action Due Date:** 11/21/2005

Action: Review structural analysis of AMS-02 and develop first-order estimate for how much additional mass can be carried without modifying the existing structure.

Action Status:

Open Action Items Report

Open Item Number: 05-042 **RID Open Date:** 9/14/2005

Title: Helium Venting Hazard Analysis

Intiator(s):

Description: Provide hazard analysis for venting of helium from the main tank.

Action Item Information

Actionee(s): Chris Tutt/ESCG **Action Due Date:** 10/28/2005

Action: Take existing hazard analysis of helium venting presented to NASA and create stand-alone report for delivery to ESTEC.

Action Status:

Open Action Items Report

Open Item Number: *05-043* ***RID Open Date:*** *9/14/2005*

Title: *Helium Venting Hazard Analysis*

Intiator(s):

Description: *Provide hazard analysis for venting of helium from the main tank.*

Action Item Information

Actionee(s): *Gaetan Piret/ESTEC* ***Action Due Date:*** *11/30/2005*

Action: *Upon delivery of hazard analysis described in 05-042, evaluate potential hazards to EMI and TV test chambers.*

Action Status:

Open Action Items Report

Open Item Number: 05-044 **RID Open Date:** 9/14/2005

Title: Burst Disk Vent Lines

Intiator(s):

Description: Attaching a vent line to the burst disk vent location would simplify test setup.

Action Item Information

Actionee(s): Phil Mott/ESCG **Action Due Date:** 10/28/2005

Action: Evaluate feasibility of attaching a vent line at the main tank burst disk vent location.

Action Status: 11/4/2005 - Simple diverter may be more feasible than a fill vent line. SCL to provide exact venting locations, expected volumes, and plume temperatures to JS. JS to review and develop preliminary design.

Open Action Items Report

Open Item Number: 05-046 **RID Open Date:** 9/14/2005

Title: Thermal Math Model Compatibility

Intiator(s):

Description: LSS and AMS thermal models must be brought into a compatible software package in order to do pre-test analysis.

Action Item Information

Actionee(s): Gaetan Piret/ESTEC **Action Due Date:** 9/30/2005

Action: ESTEC to determine the most cost-effective method for converting the LSS model into a SINDA compatible format.

Action Status: 10/17/2005 - ESTEC will convert the model themselves and provide test cases to CGS by the end of the year.

Open Action Items Report

Open Item Number: 05-048 **RID Open Date:** 9/14/2005

Title: LSS Vacuum Gages

Intiator(s):

Description: Determine whether LSS vacuum gages will function within the AMS-02 magnetic field.

Action Item Information

Actionee(s): Gaetan Piret/ESTEC **Action Due Date:** 11/30/2005

Action: Determine whether LSS vacuum gages will function within the AMS-02 magnetic field.

Action Status:

Open Action Items Report

Open Item Number: 05-049 **RID Open Date:** 9/16/2005

Title: Supercritical Startup

Intiator(s):

Description: Determine whether or not the TTCS pumps can be started with vapor in the pump.

Action Item Information

Actionee(s): Johannes Van Es/NLR **Action Due Date:** 10/31/2005

Action: Perform test to determine performance of the pump while pumping vapor, including expected bearing life and pressure head.

Action Status: 11/10/2005 - Test complete - results expected soon.

Open Action Items Report

Open Item Number: 05-053 **RID Open Date:** 9/16/2005

Title: CO2 Levels

Intiator(s):

Description: TTCS requires an adequate CO2 charge prior to launch.

Action Item Information

Actionee(s): Johannes Van Es/NLR **Action Due Date:** 9/22/2005

Action: Assess whether TTCS systems should be refilled prior to launch.

Action Status: 11/10/2005 - UT inspection not possible - gamma ray and x-ray inspection techniques being reviewed. Filling options look very unlikely based on access issues.
9/23/2005 - CAST investigating whether or not accumulator volume can be inspected ultrasonically.

Open Action Items Report

Open Item Number: 05-054 **RID Open Date:** 9/16/2005

Title: Leak Before Burst Analysis

Intiator(s):

Description: Determine whether current condensor tube design is acceptable to NASA safety community.

Action Item Information

Actionee(s): Chris Tutt/ESCG **Action Due Date:** 9/30/2005

Action: Obtain written concurrence from Glenn Ecord and Bill Manha that existing condensor tube and magnetic flange design and verification plan are acceptable.

Action Status: 11/10/2005 - Magnetic flange added to list.

Open Action Items Report

Open Item Number: 05-057 **RID Open Date:** 9/16/2005

Title: Two-Phase Modelling

Intiator(s):

Description: Provide details on specific two-phase modelling assumptions used in TTCS analysis.

Action Item Information

Actionee(s): Aswin Pauw/NLR **Action Due Date:** 10/31/2005

Action: Provide description of two-phase modelling assumptions used to NASA for review.

Action Status: 11/10/2005 - SYSU has developed description. Johannes Van Es to forward to Craig Clark for review.

Open Action Items Report

Open Item Number: 05-058 **RID Open Date:** 9/16/2005

Title: Two-Phase Flow

Intiator(s):

Description: Evaluate split of two-phase flow exiting the heat exchanger

Action Item Information

Actionee(s): Johannes Van Es/NLR **Action Due Date:** 10/15/2005

Action: Review analysis of two-phase flow of CO2 exiting heat exchanger and ensure that assumptions made for dividing the flow between the two loops were appropriate.

Action Status:

Open Action Items Report

Open Item Number: 05-059 **RID Open Date:** 9/16/2005

Title: Two-Phase Flow Paper

Intiator(s):

Description: Provide paper on two phase flow in small diameter tubes and geometric vapor flow blocker

Action Item Information

Actionee(s): John Cornwell/NASA, Gene Ungar/NASA **Action Due Date:** 9/21/2005

Action: Provide paper to NLR.

Action Status: 10/17/2005 - Per John Cornwell, paper will be delivered soon.

Open Action Items Report

Open Item Number: 05-060 **RID Open Date:** 9/16/2005

Title: ID Tolerances

Intiator(s):

Description: Assess the effect of inner diameter manufacturing tolerances on pressure drop and thawing MDP in condenser tubes.

Action Item Information

Actionee(s): Johannes Van Es/NLR **Action Due Date:** 10/15/2005

Action: Assess the effect of inner diameter manufacturing tolerances on pressure drop and thawing MDP in condenser tubes.

Action Status: 11/10/2005 - ECD for analysis now 11/11.

Open Action Items Report

Open Item Number: 05-062 **RID Open Date:** 9/16/2005

Title: TTCB Integration

Intiator(s):

Description: Assess TTCB integration procedures against SCL Warm Valve Box and TRD Gas Supply Lower Bracket.

Action Item Information

Actionee(s): Corrado Gargiulo/INFN **Action Due Date:** 9/30/2005

Action: Assess TTCB integration procedures against SCL Warm Valve Box and TRD Gas Supply Lower Bracket.

Action Status: 11/10/2005 - No interference issues between TTCB and TRD. Corrado Gargiulo still working with SCL to determine if there are any interferences with magnet hardware.

Open Action Items Report

Open Item Number: 05-065 **RID Open Date:** 9/16/2005

Title: TTCS Tube Routing

Intiator(s):

Description: Determine routing locations for TTCS tubes.

Action Item Information

Actionee(s): Antonio Alvino/INFN, Gerrit Van Donk/NLR **Action Due Date:** 1/1/2006

Action: Upon completion of 05-064, develop detailed TTCS tubing design.

Action Status:

Open Action Items Report

Open Item Number: 05-067 **RID Open Date:** 9/16/2005

Title: TTCS Tube Relative Displacements

Intiator(s):

Description: Provide relative displacements for TTCS tube routing areas.

Action Item Information

Actionee(s): Bruce Sommer/ESCG **Action Due Date:** 9/16/2005

Action: Provide relative displacements for TTCS tube routing areas.

Action Status:

Open Action Items Report

Open Item Number: 05-068 **RID Open Date:** 9/16/2005

Title: Tracker Radiator Integration Jig

Intiator(s):

Description: Provide design for Tracker Raditor Integration Jig.

Action Item Information

Actionee(s): Zhenhui He/SYSU **Action Due Date:** 10/31/2005

Action: Provide design for Tracker Raditor Integration Jig.

Action Status:

Open Action Items Report

Open Item Number: 05-069 **RID Open Date:** 9/16/2005

Title: Thermal Tubing Support Beam

Intiator(s):

Description: Thermal Tubing Support Beam needs to be assessed for possible interferences with other hardware.

Action Item Information

Actionee(s): Stephen Harrison/SCL **Action Due Date:** 9/30/2005

Action: Assess support beam violations into magnet Keep Out Zone.

Action Status:

Open Action Items Report

Open Item Number: 05-070 **RID Open Date:** 9/16/2005

Title: Thermal Tubing Support Beam Mass

Intiator(s):

Description: Mass of Thermal Support Beam needs to be calculated and tracked.

Action Item Information

Actionee(s): Robert Becker/MIT **Action Due Date:** 10/31/2005

Action: Estimate total weight of support beam and a reasonable division of the total mass between the Cryocooler and TTCS mass budgets.

Action Status: 11/4/2005 - Robert Becker/MIT provided estimate based on Al construction, but is still to provide updated mass based on CFRP construction.

Open Action Items Report

Open Item Number: 05-071 **RID Open Date:** 10/28/2005

Title: Fill Port Mounting Details

Intiator(s): Trent Martin

Description: ESCG needs details of the fill port mounting so that the VC can be assessed for structural margins.

Action Item Information

Actionee(s): Stephen Harrison/SCL **Action Due Date:** 12/1/2005

Action: Provide details of fill port mounting concept to Phil Mott/ESCG.

Action Status:

Open Action Items Report

Open Item Number: *05-072* ***RID Open Date:*** *10/28/2005*

Title: *Cryogenic GSE safety information*

Intiator(s): *Trent Martin*

Description: *ESCG needs to begin work on the Phase II Ground Safety Package*

Action Item Information

Actionee(s): *Alexander Gretchko/MIT* ***Action Due Date:*** *1/1/2006*

Action: *MIT to provide details of each piece of cryogenic ground safety equipment that will be used at KSC to Art Nelson/ESCG to allow development of the Phase II Ground Safety Package. Data required includes power usage, intended usage location (on pad, in SSPF, etc.), maximum design pressure of pressurized tanks, lines, and fittings, helium venting rates and vent locations, and any special requirements.*

Action Status:

Open Action Items Report

Open Item Number: 05-073 **RID Open Date:** 10/28/2005

Title: Helium Diverter Design

Intiator(s): Trent Martin

Description: Multiple test sites need details on how helium venting will be controlled for worker safety.

Action Item Information

Actionee(s): Stephen Harrison/SCL **Action Due Date:** 1/1/2006

Action: SCL to provide details on which port locations could potentially vent helium gas, including for each port details on vent rate, maximum gas volume, and plume temperature. This shall allow development of safety packages and design of an appropriate diverter.

Action Status:

Open Action Items Report

Open Item Number: 05-074 **RID Open Date:** 10/28/2005

Title: CGSE Support at Pad

Intiator(s): Trent Martin

Description: It is not clear how the cryogenic GSE, particularly the piping, will be supported at the pad.

Action Item Information

Actionee(s): Robert Becker/MIT, Alexander Gretchko/MIT **Action Due Date:** 1/1/2006

Action: Provide details on how the GSE will be supported at the pad.

Action Status:

Open Action Items Report

Open Item Number: 05-075 **RID Open Date:** 10/28/2005

Title: Using magnet at ESTEC

Intiator(s): Trent Martin

Description: Using the magnet at ESTEC may be a problem due to the steel in the thermal vac chamber.

Action Item Information

Actionee(s): John Cornwell/EC, Craig Clark/ESCG, Marco Molina/CGS **Action Due Date:** 12/1/2005

Action: Determine whether magnet should be operated during thermal vacuum test and provide assessment of how presence of steel will affect the outcome.

Action Status: 11/10/2005 - Joe Burger to contact ESTEC to determine all iron which is present in the chamber.

Open Action Items Report

Open Item Number: 05-076 **RID Open Date:** 10/28/2005

Title: GSE layouts

Intiator(s): Trent Martin

Description: Need layouts of the cryogenic GSE to support various test planning efforts.

Action Item Information

Actionee(s): Alexander Gretchko/MIT **Action Due Date:** 12/1/2005

Action: MIT to provide lists of required GSE and layouts to support 1) all operations, 2) just a pump-down from 4.2K to 1.8K, 3) steady-state system maintenance.

Action Status:

Open Action Items Report

Open Item Number: *05-077* ***RID Open Date:*** *10/28/2005*

Title: *Porous Plug*

Intiator(s): *Trent Martin*

Description: *Need more information on porous plug technology.*

Action Item Information

Actionee(s): *Trent Martin/EA2* ***Action Due Date:*** *11/10/2005*

Action: *Contact Lou Salerno at Ames to provide recommendations for porous plug usage.*

Action Status:

Open Action Items Report

Open Item Number: 05-078 **RID Open Date:** 10/28/2005

Title: MRC Valves

Intiator(s): Trent Martin

Description: MWG needs to review MRC valves as possible replacement for WEKA valves.

Action Item Information

Actionee(s): Trent Martin/EA2, Stephen Harrison/SCL **Action Due Date:** 12/1/2005

Action: Review prices of MRC valves and develop a recommendation to the Magnet Working Group for their usage in the cryomagnet.

Action Status: 11/10/2005 - Valve pricing data available, total number of valves needs to be reviewed in light of weight issues.

Open Action Items Report

Open Item Number: 05-079 **RID Open Date:** 10/28/2005

Title: Magnet Endurance Calculations

Intiator(s): Trent Martin

Description: MWG needs to review various Vapor Cooled Shield options for potential weight savings.

Action Item Information

Actionee(s): Stephen Harrison/SCL **Action Due Date:** 12/1/2005

Action: Redo endurance calculations for these configurations: 1) 4 cryocoolers running at 100W, 4 shields present; 2) 4 cryocoolers running at 150W, 3 shields present; 3) 4 cryocoolers running at 100W, 3 shields present.

Action Status: 11/10/2005 - Calculations complete and under review by the MWG.

Open Action Items Report

Open Item Number: *AMS_02-CDR-06* **RID Open Date:** *5/1/2003*

Title: *AMS-CDR-1-17: Meteoroid/Orbital Debris Shielding*

Intiator(s): *E. Christiansen/NASA*

Description: *Shielding from meteoroid/debris impact is inadequate to meet protection requirements. Shielding of pressurized vessels on AMS-02 such as the vacuum case and TRD (as well as any other pressure vessel) is required to prevent catastrophic rupture of these tanks in the event of meteoroid/debris impact which would release high-velocity fragments creating a potentially serious safety issue for on-board crew. The assessed probability of no penetration (PNP) using specified environment models is 0.97 which is far below the specified 0.997 PNP requirement. Updating ballistic limit equations and models as described in the forward work plan does not appear adequate to show compliance with requirements. Additional or significantly enhanced shielding will likely be necessary to meet safety requirements.*

Action Item Information

Actionee(s): *Dana Lear/ESCG* **Action Due Date:** *7/1/2006*

Action: *Complete analysis and coordinate design of debris shields. To be completed by Phase III Safety.*

Action Status: *05/03/05 - Email from Dana Lear/ESCG to Phil Mott/ESCG, Ross Harold/ESCG, and Trent Martin/EA2. The AMS-02 modeling for the MMOD assessment was completed last week. Additionally, the BUMPER geometry runs have been completed. Since the input scripts have not been run in years, I'm going through and verifying/updating all inputs for both the shield ballistic response definitions (BLEs) and the mission parameters.*
02/09/05 - Chris Tutt/ESCG sent an email to Dana Lear/ESCG requesting a letter from Eric Christiansen/KX with the requirements and his signature.
01/19/05 - L. Hill/LMSO to get in touch with D. Lear/LMSO to discuss what L. Hill/LMSO needs for Phase II. C. Tutt/LMSO, P. Mott/LMSO, & R. Harold/LMSO need to be involved. T. Martin/EA stated that anything pressure safety critical needs to be covered.

Open Action Items Report

Open Item Number: *AMS_02-CDR-08* **RID Open Date:** *5/1/2003*

Title: *Shear Analysis of Items in Enlarged Holes*

Intiator(s): *B. Ritter/GSFC*

Description: *Bolts attaching the support ring to the conical flange were assumed to transfer shear, even though they are in sloppy holes this is non-conservative.*

Action Item Information

Actionee(s): *Chris Tutt/ESCG* **Action Due Date:** *7/31/2005*

Action: *Work with SWG to resolve concerns with compliance with NASA-STD-08307, including bolts in sloppy holes being assumed to take shear.*

Action Status: *8/15/2005 - Analysis currently low priority. Bruce Sommer to review analyst workloads and estimate completion date.*
7/22/2005 - Initial VC flange loads obtained with latest model. These loads will be used in the updated analysis.
6/17/2005 - SWG agrees that 08307 will only apply to safety critical fasteners.
5/11/2005 - Resolution plan under development. Proposal complete but needs to be written up and approved by Structures Working Group (SWG).
2/9/2005 - Action item due date was changed to May 31, 2005. Bolt analysis was done to Lockheed Martin standards. Structures Working Group (SWG) has new standards. Currently looking to see how many interfaces have issues and what needs to be done. Action item was changed from 'Work bolt concerns with the SWG.' to 'Work with SWG to resolve concerns with compliance with NASA-STD-08307, including bolts in sloppy holes being assumed to take shear.'

Open Action Items Report

Open Item Number: AMS_02-CDR-09 **RID Open Date:** 5/1/2003

Title: AMS-CDR-2-15: Missing Documents - Structural Analysis

Intiator(s): Murthy Pinnamaneni Structures/Boeing

Description: The following items were not available in the Data Package: design load factors, dynamic analysis procedure and results. From 2.2.1, AMS Report Outline.doc, Magnetic Strap Analysis and the Coupled Loads Analysis, which are identified to be in ´´separate sections.´´ Reports/documents that include: Dynamic Loads Analysis Description; Payload/Shuttle Interface Loads; Trunnion Deflection; Trunion Misalignment Loads: and Uncertainty Factors Used in the Analysis.

Action Item Information

Actionee(s): Chris Tutt/ESCG **Action Due Date:** 7/1/2006

Action: Update stress report and dynamics analyses reports. To be completed by Phase III Safety Data Pack.

Action Status:

Open Action Items Report

Open Item Number: AMS_02-CDR-12 **RID Open Date:** 5/1/2003

Title: AMS-CDR-4-18: Presentation Issues

Intiator(s): H. Hoang/PEI
J. Fu/PEO

Description: The presentation for avionics is not adequate for documentation purpose to show compliance with SSP 57003 requirements.

Action Item Information

Actionee(s): Tim Urban/ESCG **Action Due Date:** 3/31/2005

Action: Supply document listing EMI/electrical specs.

Action Status: 9/2/2005 - Urban has sent CR text to Boeing PEI Hoang. Review meeting is scheduled for the Tuesday, Sept. 6 (yes, 2005). After Boeing PEI concurrence, the CR will be submtted for both the Hardware / Station ICD and the PIH ICD.
8/22/2005 - Draft version of CR complete. Tim Urban attempting to get Henry Hoang's concurrence before it is released as a CR. Win Reid and Bob Miley to assist in arranging meeting.
6/29/2005 - Tim Urban/ESCG to update PIH ICD based on Henry Hoang's inputs. Update due 8/22, to be released as a CR.
2/09/2005 - Try to get initiator's approval to merge this CDR action item with AMS-CDR-4-20 (OPMT action item AMS_02-CDR-13 by next CCB. Action item due date was changed to March 31, 2005.
1/05/2005 - Paul Nemeth/LMSO to ask initiator if this RID can be rolled into RID AMS-CDR-4-18 and Open Action Item AMS_02-CDR-13.

Open Action Items Report

Open Item Number: *AMS_02-CDR-13* **RID Open Date:** *5/1/2003*

Title: *AMS-CDR-4-20: Power Compatibility and EMC Testing*

Intiator(s): *H. Hoang/PEI*
J. Fu/PEO

Description: *The EME Control Plan (or equivalent) used to establish the plan for how AMS will be compatible with the ISS EMI requirements is lacking in the CDR package.*

Action Item Information

Actionee(s): *Tim Urban/ESCG* **Action Due Date:** *3/31/2005*

Action: *Supply EME control plan.*

Action Status: *8/22/2005 - Draft version of CR complete. Tim Urban attempting to get Henry Hoang's concurrence before it is released as a CR. Win Reid and Bob Miley to assist in arrangjng meeting.*
6/29/2005 - Tim Urban/ESCG to update PIH ICD based on Henry Hoang's inputs. Update due 8/22, to be released as a CR.
2/09/2005 - Try to get initiator's approval to merge this CDR action item with AMS-CDR-1-18 (OPMT action item AMS_02-CDR-12 by next CCB. Action item due date was changed to March 31, 2005.
1/05/2005 - Tim Urban/LMSO to provide status March 2005.

Open Action Items Report

Open Item Number: AMS_02-PDS_CDR-06 **RID Open Date:** 4/18/2005

Title:

Intiator(s): Tim Urban

Description:

Action Item Information

Actionee(s): M. Cova **Action Due Date:** 10/15/2005

Action: Re-evaluate thermal optical properties on the top of the PDS as there are no longer heaters located there (breakdown of MLI vs. white paint). QM & FM different ?

Action Status: 11/7/2005 - QM no longer exists, so second question is now irrelevant. All further PDS activities on hold until 6 Feb 2006.
8/2/2005 - Awaiting thermal analysis of revised worst hot case.

Open Action Items Report

Open Item Number: AMS_02-PDS_CDR-08 **RID Open Date:** 4/18/2005

Title:

Intiator(s): Tim Urban

Description:

Action Item Information

Actionee(s): S. Alia **Action Due Date:** 5/16/2005

Action: Add 0.03 µF per 3.2.2.2.2.A of SSP 57003, and add verification by design inspection or test.

Action Status: 11/7/2005 - All further PDS activities on hold until 6 Feb 2006.
8/22/2005 - CGS proposes release of updated document by 9/19.
8/15/2005 - Tim Urban to contact Sergio Alia and resolve remaining concerns. Closure expected by 9/5.

Open Action Items Report

Open Item Number: AMS_02-PDS_CDR-09-2 **RID Open Date:** 4/18/2005

Title:

Intiator(s): Tim Urban

Description:

Action Item Information

Actionee(s): S. Alia **Action Due Date:** 5/16/2005

Action: Update document for maximum operating temperature of 51°C (Section 3.2, requirement ID PDS-ENV-3).

Action Status: 11/7/2005 - All further PDS activities on hold until 6 Feb 2006.
8/22/2005 - CGS proposes release of updated document by 9/19.
8/2/2005 - MOT should be changed to match updated worst case hot temperature.

Open Action Items Report

Open Item Number: *AMS_02-Thermal_CDR-03* **RID Open Date:** *4/4/2005*

Title: *Design Pressures Based on Operational Temperature*

Intiator(s): *Chris Tutt/ESCG*

Description: *In each specification, the requirement states "The LHP shall be designed for an internal Maximum Operating Pressure which is equal to the vapour pressure of the working fluid at Maximum Operating Temperature." The LHP should instead be designed to survive the Maximum Design Pressure, which will be the larger of either the pressure of the working fluid at the maximum survival temperature or, for those LHPs using ammonia as the working fluid, the maximum pressure that could occur in a trapped volume if the ammonia were to freeze and undergo local thawing.*

Action Item Information

Actionee(s): *M. Molina/CGS* **Action Due Date:** *6/15/2005*

Action: *Replace Maximum Operating Pressure with Maximum Design Pressure and change description of required calculations to match.*

Action Status: *11/7/2005 - Christian Vettore running analysis to show thermal gradients across radiator panels. Results expected 11/15.*
10/17/2005 - Updated results to be presented at October TIM.
8/10/2005 - CGS proposed 9/30 for release of updated documents.
8/9/2005 - Craig Clark, Chris Tutt, and Leland Hill met to review analysis requirements. JS to do initial fault screening analysis based on information currently available in house. Craig to confirm with Marco Molina that we have latest data available. Analysis of certain systems (CAB, PDS, etc) on hold pending finalization of design.
8/3/2005 - Issue reviewed at TWG and MDP calculation assumptions defined for each pressure system. Maximum design temperatures provided by CGS 8/3. MDP calculations in work, but clearly heater circuits will be safety critical.
5/25/2005 - Leland Hill working this issue with Reinhard Schlitt. MDP calculation under review.

Open Action Items Report

Open Item Number: AMS_02-Thermal_CDR-06 **RID Open Date:** 4/4/2005

Title: CAB MLI Discrepancy

Intiator(s): Chris Tutt/ESCG

Description: DISCREPANCY
Section 3.3 of the CAB LHP Freezing Assessment states that MLI is needed over the cylindrical spring section of the LHP and the section running across the top of the CAB. These areas do not appear to be covered by MLI based on the description in the CAB section of the MLI document.

SUGGESTED SOLUTION
Add drawing to MLI description showing where CAB MLI is located relative to the CAB LHP. Add MLI to cover required sections of CAB LHP if not currently present.

SUPPLIER'S RESPONSE
We' ll do that as the CAB TCS design is completed.

Action Item Information

Actionee(s): Marco Molina/CGS **Action Due Date:** 6/15/2005

Action: Add drawing to MLI description showing where CAB MLI is located relative to the CAB LHP. Add MLI to cover required sections of CAB LHP if not currently present.

Action Status: 8/3/2005 - Final MLI design on hold pending final CAB analysis - scheduled for closure on 9/15.

Open Action Items Report

Open Item Number: *AMS_02-Thermal_CDR-15* **RID Open Date:** *4/4/2005*

Title: *Inconsistent NAS1351 Bolt Yield Strengths*

Intiator(s): *Bruce Sommer/ESCG*

Description: *DISCREPANCY*
Yield strength for NAS1351 bolts in OHB report is not the same as the yield strength for the same fastener type in the CGS report. This is consistent for all OHB v.s. CGS reports.

Bolt NAS1351
OHB Yield Allowable 950 MPa (138 ksi)
CGS Yield Allowable 827 MPa (120 ksi)

Action Item Information

Actionee(s): *Marco Molina/CGS* **Action Due Date:** *6/15/2005*

Action: *Find the documentation that verifies the yield strength of the fastener and update all reports to include the same allowable for the same bolt type.*

Action Status: *11/7/2005 - Contract negotiations still ongoing. Best estimate for test date is now 1/ 2006.*
8/10/2005 - CGS proposes test data would be available to SWG by ATP+2 months. The final analysis report would be available 2.5 months after written acceptance by SWG.
5/06/2005 - Updated document received and is under review.
4/25/2005 - Procurement specifications FFS86E for NAS1351 fasteners was sent to CGS and OHB on 04/25/05. Page 7 of the document shows a minimum yield strength for these bolts is 120 ksi.

Open Action Items Report

Open Item Number: *AMS_02-Thermal_CDR-17* **RID Open Date:** *4/7/2005*

Title: *Insert test and its applicability to different size of insert*

Intiator(s): *H. C. Lo/NASA-JSC*

Description: *DISCREPANCY*
Three inserts, with size 3 fastener and face sheet of material 2024, were tested. The requirement to test 12 more insert has been planned. The upcoming test will use 6061 material face sheet. Also, there are two types of inserts, namely size 3 and size 4. The test result based on size 3 and 2024 will be deemed applicable to size 4 and 6061. Rationale has to be provided to make this jump of application.

Action Item Information

Actionee(s): *Marco Molina/CGS* **Action Due Date:** *6/15/2005*

Action: *Test result has to be presented and rationale given for the test applicability to cover size 4 insert and different face sheet material 6061. Test proposal end of April. Perform test ASAP*

Action Status: *8/8/2005 - CGS proposes ATP+2 months as projected test date.*

Open Action Items Report

Open Item Number: *AMS_02-Thermal_CDR-56* **RID Open Date:** *4/4/2005*

Title: *CAB Heaters*

Intiator(s): *Craig Clark/ESCG*

Description: *DISCREPANCY*
CAB heaters are not defined.

SUGGESTED SOLUTION
Provide design details for CAB heaters

SUPPLIER'S RESPONSE
CAB design to be completed yet.
Details to be provided after design completion.

Action Item Information

Actionee(s): *Christian Vettore/CGS* **Action Due Date:** *8/1/2005*

Action: *Provide design details for CAB heaters.*

Action Status: *8/3/2005 - CGS provided updated CAB cold case temperatures to CRISA for heater sizing. Final design expected 9/15/2005. Actionee changed to Christian Vettore.*
6/5/2005 - Date changed to 8/1/2005 to allow for CAB model improvements.
5/19/05 Heaters cannot be sized until CAB design is complete. On agenda for Madrid.

Open Action Items Report

Open Item Number: *AMS_02-Thermal_CDR-57* **RID Open Date:** *4/4/2005*

Title: *TRDGB heaters*

Intiator(s): *Craig Clark/ESCG*

Description: *DISCREPANCY*
Analysis of TRDGB heaters not provided.

SUGGESTED SOLUTION
Provide analysis for TRDGB heaters

SUPPLIER'S RESPONSE
Failure on analysis will be done by TRDGB thrmal responsible.

Action Item Information

Actionee(s): *Ulrich Becker/MIT, Martina Green/MIT* **Action Due Date:** *6/1/2005*

Action: *Finalize TRD Gas Supply tank heater design, then analyze system to determine maximum design pressure which could occur after any two faults in the safety circuit. Once that MDP is available, confirm that tank burst pressure and LBB analysis still meet requirements.*

Action Status: *11/7/2005 - Chris Tutt to review contract status with AMS-02 business office and determine likelihood of MIT work being accepted.*
8/22/2005 - Actionees changed to Ulrich Becker and Martina Green.
8/15/2005 - Trent Martin, Paul Nemeth, and Craig Clark to meet with Ulrich Becker and discuss analysis plan.
8/3/2005 - Craig Clark to get contract status from Ulrich Becker to quell disquieting rumors.
5/19/05 - Analysis is on hold pending signed contract between JS and ETH/MIT.

Open Action Items Report

Open Item Number: *AMS_02-Thermal_CDR-60* **RID Open Date:** *4/4/2005*

Title: *Crate radiator heaters*

Intiator(s): *Craig Clark/ESCG*

Description: *DISCREPANCY:*
Crate radiator heaters are not defined.

SUGGESTED SOLUTION
Provide details for crate radiator heaters.

Action Item Information

Actionee(s): *Christian Vettore/CGS* **Action Due Date:** *8/15/2005*

Action: *Provide PDS heater design allowing box to warmed to switch-on temperature with only one power feed at arm voltage levels.*

Action Status: *11/7/2005 - Detailed analysis shows that PDS can survive with only 16.7A coming from the arm. Final decision on heater design to be made by 11/10.*
8/22/2005 - Tim Urban to contact Russ Long and get appropriate technical point of contact at MDR.
8/10/2005 - CGS proposes 9/30 as release date for updated heater documents.
8/8/2005 - Bob Miley/OZ to identify technical POC for 1800W requirement.
5/27/2005 - Heater details provided, but warming the PDS was found to require both A&B power feeds. Only one feed will be available while on the arm. CGS to work issue.

Open Action Items Report

Open Item Number: *AMS_02-Thermal_CDR-68* **RID Open Date:** *4/4/2005*

Title: *TRD Attitudes*

Intiator(s): *Craig Clark/ESCG*

Description: *TRD was only analyzed in 2 ISS attitudes, both at beta=+75. This is not enough to determine if all requirements are met.*

Action Item Information

Actionee(s): *R. Schlitt/OHB, C. Clark/ESCG* **Action Due Date:** *6/15/2005*

Action: *Analyze TRD for the entire range of ISS attitudes and beta angles. Also all STS free flying, docked on ISS, and handoff cases.*

Action Status: *11/7/2005 - OHB proposes 12/7 for release of updated analysis report.*
8/15/2005 - New thermal cases identified and provided to CGS. CGS gathering thermal data at TRD interfaces and providing that information to OHB. OHB will then update their anaylsis using new temperature data. CGS expects to deliver interface data by 9/5, OHB tentatively expected to deliver new results on 9/22.
8/3/2005 - Initial TRD results presented at TWG look promising, but some model refinements were identified.
6/5/1005 - TRD thermal model to be increased to 15 nodes. Still to be verified whether 15 nodes will be sufficient.
5/19/2005 - OHB will perform analyses considering all attitudes and transients. This will be done after a TVT test and subsequent TRD model update.

Open Action Items Report

Open Item Number: *AMS_02-Thermal_CDR-82* **RID Open Date:** *4/4/2005*

Title: *CAB Heater Schematic*

Intiator(s): *Mike Capell/AMS*

Description: *DISCREPANCY*
Looking at Fig 4-2, pg 20, I see that the thermostats for the CAB are both placed on the return line from the heaters. Is there a reason for this ? Usually we have been placing the first one on the return line and the second one on the input line because we understood this was the "normal practice". I don't think it makes much difference - but we should stick to one way or the other, no ?

SUGGESTED SOLUTION
Need comments

SUPPLIER'S RESPONSE
Will be fixed

Action Item Information

Actionee(s): *Marco Molina/CGS* **Action Due Date:** *8/1/2005*

Action: *Figure needs to be fixed.*

Action Status: *11/7/2005 - ECD for new heater document is 12/1.*
8/10/2005 - CGS proposes completion of CAB design + 1 month for formal release date of updated heater doucment. This would currently correspond to 10/15.

Open Action Items Report

Open Item Number: *AMS_02-TTCS_PDR-01* **RID Open Date:** *4/4/2005*

Title: *Detail Finite element model for the thermal bar and other related structures not available for review*

Intiator(s): *H. C. Lo/NASA-JSC*

Description: *DISCREPANCY:*
Detail finite element model for the thermal bar and other related structures is not presented in detail in the subject document for review. In addition, how the finite element model is constrained is not presented.

SUGGESTED SOLUTION:
Provide detail finite element model for review. If CAD model is available for the evaporator assembly, S&M (structures & Mechanism) would also like to review it.

Action Item Information

Actionee(s): *Eric Perrin/Uni-Ge* **Action Due Date:** *7/15/2005*

Action: *Provide detailed finite element model for review.*

Action Status: *11/7/2005 - Actionee changed to Eric Perrin.*
11/4/2005 - Thermal bars part of the tracker system, not the TTCS, and have been included in the tracker FEM. Originator asked to withdraw RID.
9/9/2005 - NLR proposes changing actionee on this RID to Tracker group. Exact actionee TBD.
8/29/2005 - All TTCS actions are on agenda for TWG meeting in Emmeloord.
8/8/2005 - Bruce Sommer to contact Johannes Van Es and get status on this and all subsequent TTCS actions.

Open Action Items Report

Open Item Number: *AMS_02-TTCS_PDR-02* **RID Open Date:** *4/4/2005*

Title: *Thermal bars frequency analysis*

Intiator(s): *H. C. Lo/NASA-JSC*

Description: *DISCREPANCY:*
1. There is no figure 11, as mentioned.
2. When TPG material is neglected, the first mode shown is to be 80 hz which is close to a test result of 84 hz. However, when the TPG material is not neglected, the comparable analytical mode (second mode at 152 hz) is much higher than the test result.

SUGGESTED SOLUTION:
Explanation of the discrepancy.

Action Item Information

Actionee(s): *Eric Perrin/Uni-Ge* **Action Due Date:** *7/15/2005*

Action: *NLR to provide explanation of the discrepancy and/or update document.*

Action Status: *11/7/2005 - Actionee changed to Eric Perrin.*
11/4/2005 - Thermal bars part of the tracker system, not the TTCS, and have been included in the tracker FEM. Originator asked to withdraw RID.
9/9/2005 - Bart Verlaat/NIKHEF to provide detailed drawings of surrounding structure to APO. Typo to be corrected in next release of document.
8/15/2005 - Bruce Sommer to contact Divac Rapin and try to work the issue through the Tracker group instead of the TTCS group.

Open Action Items Report

Open Item Number: *AMS_02-TTCS_PDR-03* **RID Open Date:** *4/4/2005*

Title: *Evaporator tail need a redesign*

Intiator(s): *H. C. Lo/NASA-JSC*

Description: *DISCREPANCY:*
1. At the time of this delta CDR, section 6 still indicates a need for evaporator tail redesign due to large deformation. The large deformation is caused by evacuated vacuum case before launch.

SUGGESTED SOLUTION:
Need to present the evaporator tail redesign as soon as possible.

Action Item Information

Actionee(s): *Johannes Van Es/NLR* **Action Due Date:** *7/15/2005*

Action: *NLR to provide evaporator redesign details.*

Action Status: *11/7/2005 - Johannes to send details to Bruce Sommer for review.*
9/9/2005 - New design to be presented at CDR.

Open Action Items Report

Open Item Number: *AMS_02-TTCS_PDR-04* **RID Open Date:** *4/4/2005*

Title: *Thernal Bar Frequency Analysis*

Intiator(s): *H. C. Lo/NASA-JSC*

Description: *DISCREPANCY:*
frequency analysis was done for each components. This approach is fine as long as each component is isolated to each other. However, there is no clear justification for this.

SUGGESTED SOLUTION:
Present rationale for doing frequency analysis for each component.
Or perform analysis for the complete evaporator assembly.

Action Item Information

Actionee(s): *Eric Perrin/Uni-Ge* **Action Due Date:** *7/15/2005*

Action: *NLR to present rationale for doing frequency analysis for each component or perform analysis of complete assembly.*

Action Status: *11/7/2005 - Actionee changed to Eric Perrin.*
11/4/2005 - Thermal bars part of the tracker system, not the TTCS, and have been included in the tracker FEM. Originator asked to withdraw RID.
9/9/2005 - NLR states that frequency analysis was done by parts for contractual reasons. Bart Verlaat/NIKHEF to provide detailed drawings of surrounding structure.

Open Action Items Report

Open Item Number: AMS_02-TTCS_PDR-05 **RID Open Date:** 4/4/2005

Title: Incorrect Figure Title

Intiator(s): H. C. Lo/NASA-JSC

Description: DISCREPANCY:
Figure 15 is mention in section 6. But there is no figure 15.

SUGGESTED SOLUTION:
Correct the typo.

Action Item Information

Actionee(s): Johannes Van Es/NLR **Action Due Date:** 7/15/2005

Action: NLR to correct typos in next release of document.

Action Status: 9/9/2005 - Typo will be corrected in next release of document.

Open Action Items Report

Open Item Number: *AMS_02-TTCS_PDR-06* **RID Open Date:** *4/4/2005*

Title: *Installation deformation release*

Intiator(s): *H. C. Lo/NASA-JSC*

Description: *DISCREPANCY:*

1. It is not clear how the assembly induced deformation is released after assembly. In one instance, it indicates that the 2mm deformation will be released. And in the other instance, it indicates that the 10 mm deformation is not acceptable and requires a evaporator tail redesign.

2. It is not clear how to measure the induced installation deformation. Or is there such a procedure to measure the installation deformation.

SUGGESTED SOLUTION:

1. Clarification required.

2. Implement a procedure to measure the installation deformation and set a range of acceptable installation deformation.

Action Item Information

Actionee(s): *Johannes Van Es/NLR* **Action Due Date:** *7/15/2005*

Action: *NLR to clarify requirement and provide detail on how deformation will be measured.*

Action Status:

Open Action Items Report

Open Item Number: *AMS_02-TTCS_PDR-07* **RID Open Date:** *4/4/2005*

Title: *Visual inspection of the weld and fracture analysis*

Intiator(s): *H. C. Lo/NASA-JSC*

Description: *DISCREPANCY:*
1. Since visual inspection will be the inspection method for post-test verification, when perform fracture analysis, the minimum crack size has to be conforming to the inspection method.
2. Is there a structural analysis performed on the welds, including fracture analysis, as required?
3. Welding is performed at room temperature. During operation, the weld will be at a much lower temperature. How do we guarantee that the weld will be performing at a much lower temperature, possibly due to residual stress?

SUGGESTED SOLUTION:
Present strength and fracture analysis.

Action Item Information

Actionee(s): *Johannes Van Es/NLR* **Action Due Date:** *7/15/2005*

Action: *NLR to provide strength and fracture analysis*

Action Status: *9/9/2005 - Weld structural and fracture analysis to be presented at TTCS CDR. NLR to coordinate requirements with Dan Rybicki.*

Open Action Items Report

Open Item Number: AMS_02-TTCS_PDR-08 **RID Open Date:** 4/4/2005

Title: Leak integrity test still TBD

Intiator(s): H. C. Lo/NASA-JSC

Description: DISCREPANCY:
Leak Integrity test still is listed as TBD.

SUGGESTED SOLUTION:
Establish leak integrity test procedure as soon as possible.

Action Item Information

Actionee(s): Johannes Van Es/NLR **Action Due Date:** 7/15/2005

Action: NLR to provide leak integrity test procedure

Action Status: 9/9/2005 - Leak integrity test procedure to be presented at CDR.

Open Action Items Report

Open Item Number: *AMS_02-TTCS_PDR-09* **RID Open Date:** *4/4/2005*

Title: *TTCS tube routing*

Intiator(s): *H. C. Lo/NASA-JSC*

Description: *DISCREPANCY:*
TTCS tube routing goes along the strut into Ram and Wake radiator. Since RAM and WAKE radiator is a much flexible structure, thus it is subjected to a large deformation and deflection. How the TTCS tube routing is attached to the strut is not clear. How the TTCS tube is attached to the strut and how it is routed into the radiator can affect the stress in the tube.

SUGGESTED SOLUTION:
Present detail information about the TTCS tube routing into RAM and WAKE radiator for review.

Action Item Information

Actionee(s): *Antonio Alvino/INFN, Bart Verlaat/NIKHEF* **Action Due Date:** *7/15/2005*

Action: *NLR to provide details of TTCS tube routing*

Action Status: *11/7/2005 - Preliminary work done by INFN. NLR working small contract with NIKHEF to get Bart Verlaat back on task.*
9/9/2005 - Tube routing details to be presented at TTCS CDR.

Open Action Items Report

Open Item Number: *AMS_02-TTCS_PDR-10* **RID Open Date:** *4/4/2005*

Title: *Negative safety margin*

Intiator(s): *H. C. Lo/NASA-JSC*

Description: *DISCREPANCY:*
Negative safety margins are shown in the analysis. Though the analysis is stated as rough analysis since detail information on components at this time is still not available, suggested remedy was not presented. Or different analysis approach is not attempted.

SUGGESTED SOLUTION:
Since this is a delta CDR, remedy for negative safety margin should be provided. The remedy can be re-design of the base plate/fasteners. Or the analysis can be re-done with different approach to show a positive safety margin. Leaving negative safety margin as presented is not desirable.

Action Item Information

Actionee(s): *Corrado Gargiulo/INFN, Xinmei Qi/SYSU* **Action Due Date:** *7/15/2005*

Action: *NLR to provide remedy for any negative margins of safety presented at PDR.*

Action Status: *9/9/2005 - Updated analysis will be presented at TTCS CDR.*

Open Action Items Report

Open Item Number: *AMS_02-TTCS_PDR-11* **RID Open Date:** *4/4/2005*

Title: *Bolt and insert analysis*

Intiator(s): *H. C. Lo/NASA-JSC*

Description: *DISCREPANCY:*
1. how the bolt analysis is done is not presented in the subject document.
2. bolt and insert technical information is not presented in the document.
3. it is not clear that pre-load is considered in the bolt in the analysis.

SUGGESTED SOLUTION:
Provide information and specification on bolts and inserts used.
Provide bolt and insert detail analysis, including applicable document for bolt analysis and demonstrate that bolt analysis is compliant with the applicable document.

Action Item Information

Actionee(s): *Corrado Gargiulo/INFN, Xinmei Qi/SYSU* **Action Due Date:** *7/15/2005*

Action: *NLR to provide bolt details and analysis for TTCS box.*

Action Status: *9/9/2005 - Details to be provided at TTCS CDR.*

Open Action Items Report

Open Item Number: *AMS_02-TTCS_PDR-12* **RID Open Date:** *4/4/2005*

Title: *Finite element analysis approach and fastener analysis*

Intiator(s): *H. C. Lo/NASA-JSC*

Description: *DISCREPANCY:*

1. "All box masses (including inside components) are modelled as uniformly distributed over the baseplate top face…"" The box itself is not connected to the base plate. And the box has its own fastening point with USS. This assumption can be in error.

2. components/baseplate interface are connected with fasteners. It appears that there is no information on these. As such, no analysis on these fasteners.

3. No analysis provided on components within TTCB.

SUGGESTED SOLUTION:

Provide information when available.

Re-do analysis as appropriate.

The components inside TTCB has to be defined as soon as possible.

Action Item Information

Actionee(s): *Corrado Gargiulo/INFN, Xinmei Qi/SYSU* **Action Due Date:** *7/15/2005*

Action: *NLR to provide design detail and finite element analysis of TTCB components.*

Action Status: *9/8/2005 - Analysis to be provided at TTCS CDR.*

Open Action Items Report

Open Item Number: *AMS_02-TTCS_PDR-14* **RID Open Date:** *4/4/2005*

Title: *TTCS fluid*

Intiator(s): *Klaus Luebelsmeyer*

Description: *DISCREPANCY:*
Using CO2 puts severe issues about freezing

SUGGESTED SOLUTION:
Investigate impact of using alternative fluids with lower melting point, like propylene.

Action Item Information

Actionee(s): *Johannes Van Es/NLR* **Action Due Date:** *7/15/2005*

Action: *NLR to investigate alternatives to CO2 to avoid freezing.*

Action Status: *11/7/2005 - CAST still pushing for alternatives to CO2. CAST will make presentation at Milano describing their proposal.*
8/8/2005 - N2O has been identified as possible alternative - it has a much lower freezing point but has worse performance. Final decision on fluid on hold pending resolution of various design and analysis issues.

Open Action Items Report

Open Item Number: AMS_02-TTCS_PDR-18 **RID Open Date:** 4/4/2005

Title: Heaters Wiring

Intiator(s): Mike Capell/AMS

Description: DISCREPANCY:
Ref Table 3-2, pg 14, it mentions the survival heaters tracker radiators are connected to the TTPD A-side and B-side. Of course they are connected
to the PDS A-Side and B-side.

Action Item Information

Actionee(s): Johannes Van Es/NLR **Action Due Date:** 7/15/2005

Action: NLR to update document as suggested in next release

Action Status: 11/8/2005 - NLR proposes 11/18 for document release date.

Open Action Items Report

Open Item Number: *AMS_02-TTCS_PDR-19* **RID Open Date:** *4/4/2005*

Title: *TTCrate location*

Intiator(s): *Mike Capell/AMS*

Description: *DISCREPANCY:*
Ref Fig 3-8, pg 16, TTCE location is shown incorrectly. It is on the bottom crate row. See attached CGS dwg. Of course I call it the TT-Crate. Of course the TTPD is still in the location indicated,

Action Item Information

Actionee(s): *Johannes Van Es/NLR* **Action Due Date:** *7/15/2005*

Action: *NLR to update document as suggested in next release*

Action Status:

Open Action Items Report

Open Item Number: *AMS_02-TTCS_PDR-20* **RID Open Date:** *4/4/2005*

Title: *Modes Missing*

Intiator(s): *Mike Capell/AMS*

Description: *DISCREPANCY:*
Usually a document like this contains a table summarizing the first N modes (their frequency and effective mass).

It is not noted that this is being/has been performed, just a few pictures (Fig 17,18,19) are included without reference.

Action Item Information

Actionee(s): *Johannes Van Es/NLR* **Action Due Date:** *7/15/2005*

Action: *NLR to provide more details in the structural analysis report.*

Action Status: *11/7/2005 - NLR proposes 12/1 for document release date.*

Open Action Items Report

Open Item Number: AMS_02-TTCS_PDR-23 **RID Open Date:** 4/4/2005

Title: Missing Analysis

Intiator(s): Craig Clark/ESCG

Description: DISCREPANCY:
No analysis results were provided for Tracker or TTCS

SUGGESTED SOLUTION:
Provide analysis results

Action Item Information

Actionee(s): Johannes Van Es/NLR **Action Due Date:** 7/31/2005

Action: NLR to provide temperature results for Tracker internals and TTCS system.

Action Status: 11/10/2005 - Thermal model being run now. Model documentation to be provided by SYSU by 11/11.
NLR proposes 12/1 for release of analysis document.

Open Action Items Report

Open Item Number: *AMS_02-TTCS_PDR-25* **RID Open Date:** *4/4/2005*

Title: *TTCS Heater Controls*

Intiator(s): *Craig Clark/ESCG*

Description: *DISCREPANCY:*
TTCS heater controls and interlocks are not well defined. Heaters that are not two-fault tolerant need to be shown by analysis not to cause a safety problem.
Start-up heaters on tubing currently have no thermostats.

SUGGESTED SOLUTION:
Provide details for TTCS heater control (computer control, thermostats, etc). Show that all heaters are two-fault tolerant or show by analysis that a failed on heater will not cause a safety problem.

Action Item Information

Actionee(s): *Johannes Van Es/NLR* **Action Due Date:** *6/30/2005*

Action: *NLR to provide details of Line heaters, including interlocks and failure analysis.*

Action Status: *11/10/2005 - NLR failure analysis complete except for condensors. Results to be presented at TWG meeting in Milano.*
8/3/2005 - Heaters will clearly be safety critical, so Craig Clark and Leland Hill to define required safety verifications.

Open Action Items Report

Open Item Number: *AMS_02-TTCS_PDR-26-1* **RID Open Date:** *4/4/2005*

Title: *TTCS Manifold Attachment*

Intiator(s): *Craig Clark/ESCG*

Description: *DISCREPANCY:*
The Upper Vacuum Case Joints may not be suitable for mounting the TTCS manifolds due to undesirable temperature extremes. This is critical to avoid CO2 freezing in the manifolds.

SUGGESTED SOLUTION:
Results of integrated thermal analysis need to be reviewed and a suitable mounting location identified.

Action Item Information

Actionee(s): *Johannes Van Es/NLR*
Marco Molina/CGS

Action Due Date: *6/15/2005*

Action: *NLR to work with CGS and NASA/ESCG to identify possible locations for mounting TTCS manifolds.*

Action Status: *11/10/2005 - Manifolds will be mounted to USS, not to the VC joints. Transport tubes still need to be assessed for freezing. Craig Clark to review analysis assumptions and propose a less conservative analysis plan.*
8/15/2005 - Bala doing fracture analysis on manifold pipes. Bala, Leland, Craig, and Chris to meet with both fracture and pressure systems team on PSRP and review proposed plan.
8/3/2005 - Preliminary thermal analysis shows that proposed manifold locations are marginal at best. Reviews of the rest of the structure for other locations are underway, but it is not clear that any location exists that will meet freezing requirements. Craig Clark to arrange meeting with safety community and discuss options.

Open Action Items Report

Open Item Number: *AMS_02-TTCS_PDR-26-2* **RID Open Date:** *4/4/2005*

Title: *TTCS Manifold Attachment*

Intiator(s): *Craig Clark/ESCG*

Description: *DISCREPANCY:*
The Upper Vacuum Case Joints may not be suitable for mounting the TTCS manifolds due to undesirable temperature extremes. This is critical to avoid CO2 freezing in the manifolds.

SUGGESTED SOLUTION:
Results of integrated thermal analysis need to be reviewed and a suitable mounting location identified.

Action Item Information

Actionee(s): *Marco Molina/CGS* **Action Due Date:** *7/15/2005*

Action: *CGS to provide interface temperatures at proposed locations defined in OPMT item AMS_02-TTCS_PDR-26-1.*

Action Status: *11/10/2005 - Manifolds will be mounted to USS, not to the VC joints. Transport tubes still need to be assessed for freezing. Craig Clark to review analysis assumptions and propose a less conservative analysis plan.*
8/8/2005 - Craig Clark to send out latest thermal analysis results to NLR for review. NLR requested to provide latest pressure data to allow accurate calculation of CO2 freezing point.

Open Action Items Report

Open Item Number: *AMS_02-TTCS_PDR-27* **RID Open Date:** *4/4/2005*

Title: *TTCS Thawing*

Intiator(s): *Craig Clark/ESCG*

Description: *DISCREPANCY:*
After an extended loss of power the CO2 in the radiator may freeze and the freezing will propagate along the tube, stopping before it get to the manifolds. Heaters will be used to first thaw the lines from the manifold end. After tubes are thawed, radiator heaters will be turned on. A safety problem may exist if radiator heaters are turned on before manifold lines are thawed. Heaters are controlled from ground command via the TTCE. There are currently no interlocks to prevent the radiator heaters turning on before the lines are thawed.

SUGGESTED SOLUTION:
Determine if there is any possibility to make this thawing process two-fault tolerant. If not provide a description of the thawing process and operational constraints to assure no inadvertent thawing of the radiator. This will need to be accepted by the safety panel.

Action Item Information

Actionee(s): *Johannes Van Es/NLR* **Action Due Date:** *6/30/2005*

Action:

Action Status: *8/4/2005 - JS met with Glenn Ecord and Nick Martinez and identified an acceptance plan for certifying the current design. Bruce Sommer to summarize and send specific data requests with NLR.*
6/29/2005 - First test successful with no ruptures. NASA still waiting for test plans, test data, or any description of test results longer than two or three sentences.

Open Action Items Report

Open Item Number: *UPS-CDR-04* ***RID Open Date:***

Title:

Intiator(s):

Description:

Action Item Information

Actionee(s): *Tim Urban/ESCG* ***Action Due Date:*** *8/26/2005*

Action: *Provide BMS qualification test report.*

Action Status: *9/2/2005 - Due to resistor problem on BMS boards, the delivery of BMS qualification test report may be delayed 3 ~ 12 weeks. Yardney is continuing to keep Tim Urban informed.*